

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-13 are currently pending. Claims 1, 6-10, 12, and 13 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claim 11 was objected to as containing an informality; Claims 1-13 were rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting central elements, regarding the term “based on” and regarding structure of Claim 11; Claims 1-13 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter; Claims 1-10, 12, and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,233,709 to Zhang et al. (hereinafter “the ‘709 patent”) in view U.S. Patent No. 6,484,283 to Stephen et al. (hereinafter “the ‘283 patent”); and Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘709 and ‘283 patents, further in view of U.S. Patent No. 6,289,486 to Lee et al. (hereinafter “the ‘486 patent”).

Applicants wish to thank the Examiner for the interview granted Applicants’ representative on September 8, 2005, at which time a proposed amendment to Claim 1 was discussed. However, no agreement was reached pending the Examiner’s further consideration of the claims upon formal submission of a response to the outstanding Office Action.

Applicants respectfully traverse the objection to Claim 11. In particular, Applicants respectfully submit that it is proper for a dependent claim to refer to an independent claim in the body of the dependent claim. Since Applicants believe that Claim 11 is in proper form,

Applicants request that the Examiner provide a reference to a Patent Office rule supporting the assertion that Claim 11 is in improper form.

Applicants respectfully traverse the rejection of Claims 10-13 under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements. In this regard, Applicants note that the Office Action asserts that “there is no connection in the body of Claims 10, 12, and 13 to hardware of any device nor is there any indication that any of the elements in the bodies of Claims 10, 12, and 13 require any hardware.”<sup>1</sup> However, Applicants note that Claims 10, 12, and 13 are means-plus-function claims that are interpreted under 35 U.S.C. § 112, sixth paragraph. Moreover, Applicants submit that 35 U.S.C. § 112, sixth paragraph, does not require that the elements expressed in “means-for” language require the use of “hardware.” Accordingly, Applicants respectfully traverse the rejection of Claims 10-13 under 35 U.S.C. § 112, second paragraph.

Applicants respectfully traverse the rejection of the claims under 35 U.S.C. § 112, second paragraph, regarding the term “based on.” Applicants respectfully submit that the use of the term “based on” in the claims is not vague or indefinite, merely broad. Applicants respectfully submit that, contrary to the implication in the Office Action, the recitation of an equation involving the maximum error rate is not required. Rather, the claims properly broadly recite, e.g., that the step of determining a maximum number of iterations is based on the maximum error rate. Thus, Applicants respectfully traverse the Examiner’s rejection, which appears to amount to a *per se* rejection of any claim reciting the words “based on.”

Applicants respectfully traverse the rejection of Claim 11 under 35 U.S.C. § 112, second paragraph, regarding the reference to Claim 10 in the body of Claim 11. As discussed above, Applicants believe this method of establishing the dependency of Claim 11 from

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<sup>1</sup> Page 3 of the outstanding Office Action.

Claim 10 is proper and that the recitation does not have to be in the preamble. Accordingly, Applicants respectfully traverse the rejection of Claim 11 under 35 U.S.C. § 112.

Applicants respectfully submit that the rejection of Claims 1-9 under 35 U.S.C. § 101 is rendered moot by the present amendment to Claim 1. Claim 1 has been amended to be directed to a computer-implemented method of optimizing a size of coded data blocks, and is therefore directed to statutory subject matter. Further, Applicants respectfully traverse the rejection of Claims 10-13 under 35 U.S.C. § 101. In this regard, Applicants note that Claims 10-13 are not directed to methods, rather to devices, which are statutory.

Amended Claim 1 is directed to a computer implemented method of optimizing a size of coded data blocks intended to be subjected to an iterative decoding process, wherein the maximum acceptable error rate of the iterative decoding process is fixed in advance, comprising: determining prior to performing the decoding process and based on the maximum acceptable error rate, (1) a submultiple block size among a plurality of integer block sizes  $N/k$ , which are submultiples of an integer block size  $N$  by an integer factor  $k$  greater than or equal to 1, wherein  $k$  is a factor of  $N$ ; and (2) a maximum number of iterations among a plurality of integers corresponding to a maximum number of iterations to be applied by the iterative decoding process on a coded data block of the submultiple block size, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. Claim 1 has been amended to clarify that the determining of the suboptimum block size and the maximum number of iterations is performed prior to performing the decoding process and that both determinations are based on the maximum error rate. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.

Regarding the rejection of Claim 1 under 35 U.S.C. § 103, the Office Action asserts that the '709 patent discloses everything in Claim 1 with the exception of determining a submultiple block size, and relies on the '283 patent to remedy that deficiency.

Applicants respectfully submit that the rejection of Claim 1 (and dependent Claims 3-9) under 35 U.S.C. § 103 is rendered moot by the present amendment to Claim 1.

The '709 patent is directed to a method and apparatus for iterative decoding of a coded information signal that allows quality of service parameters to be dynamically balanced in a telecommunications system. In particular, the '709 patent discloses a method for determining the maximum and minimum decoding iterations to be performed on an information signal based on a bit error rate value. However, regarding block size, the '709 merely discloses that the coded information signal is in the form of data frames. Thus, as admitted in the Office Action, the '709 patent fails to disclose determining a suboptimal block size among a plurality of integer block sizes in  $N/k$ , as recited in amended Claim 1. Further, Applicants respectfully submit that the '709 patent fails to disclose determining the submultiple block size and the maximum number of iterations prior to performing the decoding process and based on the maximum error rate, as recited in amended Claim 1.

The '283 patent is directed to a method and apparatus for encoding and decoding turbo codes. In particular, the '283 patent discloses that the decoder can include a SISO module and can be implemented using the MAP algorithm or the SOVA algorithm. Further, as shown in Figure 2B, the '283 patent discloses that, in the sliding window group implementation for the SISO module, the  $N$  time steps of the full turbo code block are divided into smaller groups of  $Nb1$  time steps for both forward and backward state metric updates. Further, the '283 patent discloses that  $Nb1$  is chosen such that  $n$  is an integer multiple of  $Nb1$ . However, Applicants respectfully submit that the '283 patent fails to disclose determining prior to performing the decoding process and based on the maximum

error, a submultiple block size among a plurality of integer block sizes  $N/k$ , and a maximum number of iterations to be applied by the iterative coding process on the coded data block of the submultiple block size, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized, as recited in Claim 1. Rather, the '283 patent merely discloses that  $N$  time steps of the full turbo code block can be divided into smaller groups of  $Nb1$  time steps. However, the '283 patent fails to disclose how to select  $Nb1$ , other than as an integer multiple of  $N$ . Further, the '283 patent fails to disclose that the selection of  $Nb1$  is based on the maximum error rate.

Thus, no matter how the teachings of the '283 and '709 patents are combined, the combination fails to teach or suggest the step of determining prior to performing a decoding process and based on a maximum error rate, a submultiple block size among a plurality of integers  $N/k$  and a maximum number of iterations to be applied by the iterative decoder process on a coded block of the submultiple block size such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. In particular, Applicants respectfully submit that the combined teachings of the '709 and '283 patents fail to disclose that the submultiple block size and the maximum iterations are chosen together based on the maximum acceptable error rate prior to performing a decoding process, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. The factor  $Nb1$  disclosed by the '283 patent is unrelated to the maximum number of iterations determined by the '709 patent. Moreover, the minimization of the mean number of iterations is not disclosed by the '709 patent, contrary to the assertion in the Office Action. Rather, as shown in Figure 2, the '709 patent discloses a system in which the frame processing is stopped if the convolutional redundancy code (CRC) is satisfactory or the maximum number of iterations is reached. Although the Office Action implies that this process will necessarily minimize the mean number of iterations performed

by the iterative decoding process, Applicants note that the determination of the maximum number of iterations disclosed by the '709 patent is not determined prior to the decoding process such that the mean number of iterations will be minimized. Accordingly, for the reasons stated, Applicants respectfully submit that Claim 1 (and dependent Claims 2-9) patentably define over any proper combination of the '709 and '283 patents.

Independent Claims 10, 12, and 13 recite limitations analogous to the limitations recited in Claim 1. Moreover, Claims 10, 12, and 13 have been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejections of Claims 10, 12, and 13 are rendered moot by the present amendment to those claims.

Regarding the rejection of dependent Claim 11 under 35 U.S.C. § 103, Applicants respectfully submit that the '486 patent fails to remedy the deficiencies of the '709 and '283 patents, as discussed above. Accordingly, Applicants respectfully submit that the rejection of Claim 11 is rendered moot by the present amendment to Claim 10.

Thus, it is respectfully submitted that independent Claims 1, 10, 12, and 13 (and all associated dependent claims) patentably define over any proper combination of the '709, '283, and '486 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,


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